Effects of n-3 and n-6 fatty acids on plasma eicosanoids and liver antioxidant enzymes in rats receiving total parenteral nutrition

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Abstract

The effect of total parenteral nutrition (TPN) enriched with n-3 or n-6 fatty acids on the concentration of plasma eicosanoids was evaluated in rats. Rats were divided into three groups: the control group (n = 6) was fed a chow diet and infused with saline only. Two experimental groups (n = 11, 13) received TPN solutions at an energy level of 30 kcal/100g body weight with 40% energy provided as fat. The experimental groups were maintained on TPN for a period of 7 d. The basal TPN solutions were isonitrogenous and identical in nutrient composition except for differences in lipid source. One experimental group received a safflower oil emulsion, whereas the other group received a fish oil emulsion. At the end of the experimental period, plasma 6-keto prostaglandin F1α, thromboxane B2, bleeding time, lipid peroxidation products, and antioxidant enzymes of liver were analyzed. The results demonstrated that the fish oil group had lower 6-keto prostaglandin F1α concentration than the safflower oil group. Also, plasma thromboxane B2 was the lowest in the fish oil group among the three groups. There was no difference in bleeding time among the groups. With regard to liver lipid peroxidation products, malondialdehyde concentration was not higher in the fish oil group, whereas superoxide dismutase and glutathione peroxidase activities were lower in the fish oil group compared with the control and safflower oil groups. The results suggest that TPN prepared with fish oil fat emulsion causes less accumulation of lipid peroxidation products in the liver of rats, and may be beneficial in preventing platelet aggregation.